REMARKS

Claims 1-25, 29-53 and 55-58 are now pending in the application. Applicants have amended claims 1 and 55. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 112

Claims 1-22 and 55-58 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed.

Applicants have amended claims 1 and 55 to recite "a coating including a doped metal oxide which has a resistivity of less than .001 ohm-cm…" Applicants submit that support for these claim amendments can be found in paragraph [0027]. Thus, Applicants believe this clarification obviates the new matter rejection such that claims 1-22 and 55-58 are in condition for allowance. Accordingly, reconsideration and withdrawal of the Examiner's rejections of claims 1-22 are respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 1-3, 13-15, 18-22 and 55-58 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. (U.S. Pat. No. 5,624,769) in view of Gordon (U.S. Pat. No. 4,146,657). Additionally, claims 1-2 and 55-57 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gyoten et al. (U.S. Pat. No. 7,005,205) in view of Gordon (U.S. Pat. No. 4,146,657). These rejections are respectfully traversed.

Applicants respectfully submit that neither Lit et al., nor Gyoten et al. disclose an electrical contact element having a doped metal oxide coating and that it is improper to combine Gordon with Li et al. or Gyoten et al. to cure this deficiency. In response to the previous Office Action dated April 13, 2007 Applicants argued that it is improper to combine Gordon with either Li et al. or Gyoten et al. because Gordon does not suggest the desirability and thus, the motivation, to apply a film of fluorine-doped tin oxide to the unique environment of the fuel cell disclosed by Li et al. The Examiner found this argument insufficient on the basis that the recent Supreme Court decision in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007) (Hereinafter "*KSR*") forecloses the argument that a specific teaching, suggestion or motivation is required to support a finding of obviousness. In this Office Action, the Examiner argues that it would be apparent to one skilled in the art to combine the teachings of Gordon to PEM fuel cells as taught by Li et al. or Gyoten et al., because Gordon is pertinent to the field of PEM fuel cells and addresses the same technical difficulties. Specifically, the Examiner argues that Gordon teaches applying conductive metal oxide films to a solar cells or electrochemical systems (pertinent fields) to reduce electrical resistance (the technical problem). Notwithstanding *KSR*, Applicants respectfully resubmit that it is improper to combine the teachings of Gordon to either Li et al. or Gyoten et al. for the reasons set forth below.

a. *The applications to which Gordon is directed, namely solar cells and photoelectrochemical cells, are not reasonably pertinent to the field of PEM fuel cells.*

Gordon discloses that metal oxide layers formed by its process are applicable to optical-electronic devices such as solar photovoltaic cells ("solar cells") and photoelectrochemical cells. However, none of the applications disclosed by Gordon

involve the caustic environment of a PEM fuel cell. Specifically, PEM fuel cell applications present substantial technical difficulties that solar cells and photoelectrochemical cells do not. For example, PEM fuel cell applications present substantial technical challenges preventing corrosion due to the presence of highly acidic solutions, anodic and cathodic dissolution, and hydrogen embrittlement due to exposure to pressurized hydrogen. These differences can be seen in the technical challenges Gordon sought to address, namely providing "an improved process for the production of electrically-conductive layers which are highly transparent to visible light and highly reflective to infrared light..." (Gordon, col. 1, lines 7-10, emphasis added).

The Examiner also apparently equates photoelectrochemical cells with PEM fuel cells as common to a class of electrochemical systems without explaining why this general classification would have commended itself to the inventors' attention in considering the problems associated PEM fuel cells. Electrochemical systems and their associated technical problems vary greatly and such generalities are not dispositive. It is important to look at the nature of the problem confronting the inventor in determining whether or not a reference is reasonably pertinent to the inventors' field of endeavor. See *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 758 f.2d 613, 638 (Fed. Cir. 1985), cert. dismissed, 474 U.S. 976 (1985).

b. The technical difficulties presented by the PEM fuel cell of Applicants' invention are substantially different from the technical difficulties addressed by the Gordon reference.

The technical difficulty posed by the PEM fuel cell of Applicants' invention is protecting the substrate material used in a bi-polar plate assembly from corrosion which is also electrically conductive and resistant to the corrosive environment of a PEM fuel cell. Gordon neither teaches, nor suggests that the metal oxide coatings formed by its

process possess the necessary properties of metal oxide films that would render them useful to the bi-polar plates used in PEM fuel cell applications, such as corrosion resistance, hydrophylicity, and electrical contact resistance. These material properties vary greatly and render many, if not most, metallic oxides unfit for PEM fuel cell applications. Specifically, Gordon does not disclose whether a metal oxide formed by its process is capable of achieving and maintaining low contact resistance values with respect to the substrate to which it is adhered and on an opposite surface. Gordon discloses a metal oxide layer formed on a heated glass substrate that does not pass current between the layer and the substrate. Thus, an examination of the function of the oxide layer in Gordon does not inform whether or not the metal oxide layer of Gordon is capable of maintaining the low electrical contact resistance values necessary to proper operation of the bi-polar plate. As the foregoing demonstrates, the applications to which Gordon is directed, namely solar cells and photoelectrochemical cells, are not reasonably pertinent to the field of PEM fuel cells. To this end, Applicants identified and selected a coating with a doped metal oxide composition which has advantages other than disclosed in the prior art.

c. *The knowledge possessed by one skilled in the art of PEM fuel cells and the prior art, including the art relied on by the Examiner, teach away from the Applicants' use of metal oxides in the bi-polar plate of a fuel cell.*

It is well known in the art that metal oxides are generally unfit as protective layers for the bi-polar plates used in PEM fuel cell applications. However, due to the nature of the metals used in the substrates (e.g. aluminum and titanium) and the passivating layers (e.g. stainless steel) of the bi-polar plates, highly resistive metallic oxide films form on these metallic layers when exposed to the corrosive environment of the fuel cell. (see Li et al. col. 1, lines 65-67: col. 2, lines 1-3 and Gyoten et al. col. 1, lines 60-

67: col. 2, line 1). The prior art teaches applying other non-metallic oxide coatings to the substrate or passivating layers of the bi-polar plate, such as TiN, as in Li et al. and electroconductive resin layers, as in Gyoten et al., to prevent, or at least inhibit, the formation of metallic oxide films. Contrary to the prevailing approach taken by Li et al. and Gyoten et al., Applicants have applied a doped metal oxide topcoat layer that alone provides the requisite corrosion resistance and conductivity -- an approach which was contrary to the understandings and expectations of the art that the metal oxide coating disclosed by Gordon could alone be used to protect the substrate and/or passivating layers of a bi-polar plate. Thus, Applicants submit that the structure recited in the claims would not have been obvious to those skilled in the art. *Schenck v. Nortron Corp.*, 713 F.2d 782, 785. (see also MPEP 2141.02).

d. The metal oxide layer claimed by Applicants does not merely perform the same function as the metal oxide layer disclosed by Gordon but produces results unexpected of metal oxide layers.

Gordon discloses a doped metal oxide layer on a heated glass substrate that is used to pass current in a solar cell, however the metal oxide layer disclosed by Gordon passes current within the layer and not between the layer and the substrate. In Applicants' bi-polar plate structure, the metal oxide layer passes current both within the layer and between the layer and the substrate to which it has been applied. Thus, the metal oxide layer claimed by Applicants does not merely perform the same function as the metal oxide layer claimed by Gordon. Similarly, the metal oxide layer claimed by Applicants is not merely performing the same function as the metal oxide formations disclosed by Li et al. and Gyoten et al.

In order for the metal oxide layer of Applicants' bi-polar plate to efficiently pass electrical current to and from the substrate, it must possess and maintain low contact

resistance values, in addition to low internal resistance values while operating in the corrosive environment of the fuel cell. The oxide films that form on the substrates and passivating layers of the bi-polar plate as previously described are characterized as having high contact resistance values. (see Gyoten et al. col. 4, lines 36-40). Gordon, on the other hand, merely discloses the low internal resistance of his metal oxide layer. Gordon also does not disclose whether or not the metal oxide formed by his method achieves a low contact resistance on its exposed surface that can be maintained in the environment of a fuel cell. Thus, it is unexpected that the metal oxide layer of Gordon could be applied to the bi-polar plate of a fuel cell and thereby achieve a protective layer capable of sustained current transfer.

For the reasons set forth here, Applicants respectfully submit that the Examiner's conclusion of obviousness is improper and that claims 1 and 55 are allowable over the combination of either Li et al. or Gyoten et al. and Gordon. The remaining rejected claims all depend from either claims 1 or 55 and are therefore allowable for at least the same reasons. Accordingly, reconsideration and withdrawal of the Examiner's rejections of claims 1-3, 13-15, 18-22 and 55-58 are respectfully requested.

Claims 4-12 and 16-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Li et al. (U.S. Pat. No. 5,624,769) in view of Gordon (U.S. Pat. No. 4,146,657) as applied to claim 1 above, and further in view of Applicants' Admitted Prior Art (heretofore 'the AAPA'). This rejection is respectfully traversed.

Claims 4-12 and 16-17 depend from claim 1. Based on the foregoing argument with respect to claim 1 and the combination of Gordon and Li et al., Applicants submit that claims 4-12 and 16-17 are allowable for at least the same reasons. Accordingly,

reconsideration and withdrawal of the Examiner's rejections of claims 4-12 and 16-17 are respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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